

II. REMARKS/ARGUMENTS

Claim Status

Claims 1-22 and 24-28 are pending. Claims 8-11, 13-14, 16-18, and 20-21 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 4,008,876 to Bastle, hereinafter "Bastle." Claims 1, 2, 5, and 6 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Bastle. Claims 3, 4, 12, 19, and 24-28 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Bastle in view of U.S. Patent No. 4,713,639 to Grunert et al., hereinafter "Grunert." Claims 7, 15, and 22 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Bastle in view of U.S. Patent No. 4,062,052 to Harper et al., hereinafter "Harper."

Claims 1, 2, 4, 5, 7, 8, 9, 12, 15, 16, 19, and 22 have been amended. Claims 29-31 have been newly added. Support for the amendments and newly added claims can be found in the specification as originally filed at least at Figures 1 and 2.

Applicant respectfully traverses the grounds for rejection and requests reconsideration and withdrawal of the rejections of claims 1-22 and 24-28 in view of the amendments and the following remarks.

35 U.S.C. § 102 and 103 Rejections

Independent Claims 1, 8, and 16

Independent claims 1, 8, and 16, as amended, include features that are neither disclosed nor suggested by the cited references, either taken alone or in combination, namely as represented by claim 8:

8. (Currently Amended) A solenoid assembly, for use in activating a mechanism, wherein a force required to activate said mechanism varies between a minimum force and a maximum force in relation to the time since said mechanism was last activated, said solenoid assembly comprising:

*a solenoid having an armature extending therefrom, wherein said armature moves between a first end position and a second end position, **in the first end position the armature is spaced apart from and does not contact the mechanism** and in the second end position the armature is positioned to contact the mechanism, wherein when an electrical current is applied to said solenoid, said solenoid causes said armature to exert an armature force; and*

*a delay member for delaying the movement of said armature, wherein after the initiation of an electrical current to said solenoid said delay member delays the movement of said armature from said first end position to said second end position, with a **force significantly greater than under normal operating conditions**, until such time as said armature exhibits an armature force greater than said maximum force necessary to activate said mechanism. (emphasis added)*

Claim 8 is directed to a solenoid assembly for activating a mechanism such that mechanism activation times are consistent. In fact, the assembly may provide an order of magnitude increase in activation time consistency (p. 7, lines 1-9). The assembly includes a solenoid and a delay member. The delay member provides a significantly greater than normal delay force that delays the movement of the armature from a first end position to a second end position until the armature exhibits an armature force greater than the maximum force necessary to activate the mechanism. Further, in the first end position the armature is spaced apart from and does not contact the mechanism and in the second end position the armature is positioned to contact the mechanism, thereby providing kinetic energy to activate the mechanism. This combination of delaying with a significantly greater than normal force and kinetic energy provides **consistent mechanism activation times**.

Bastle does not disclose or suggest a delay member for delaying the movement of the armature with a force significantly *greater* than under normal operating conditions, until such time as the armature exhibits an armature force greater than the maximum force necessary to activate the mechanism. In fact, Bastle minimizes any delay by employing a lost motion connection that allows almost immediate armature movement (Bastle at Figures 1 and 2). As shown in Figure 2 of Bastle, armature 32 almost immediately moves into coil 24 because the lost motion spring typically exerts a force significantly *less* than under normal operating conditions. This immediate armature motion allows armature 32 to quickly enter into coil 24, which generates an increased armature force (due to increased magnetic flux linkage), such that valve 18 may be unseated. Therefore, Bastle does not disclose or suggest a delay member for delaying the movement of the armature with a *force significantly greater than under normal operating conditions*, until such time as the armature exhibits an armature force greater than the maximum force necessary to activate the mechanism, as recited by the claims. Bastle discloses the exact **opposite**.

Bastle does not anticipate the claims, as amended, for an additional reason. In Bastle, valve 18 (the mechanism) **contacts** armature 32 in both the first end position (Fig. 1) and the second end position (Fig. 4). Therefore, Bastle does not disclose or suggest a solenoid having an armature extending therefrom, wherein said armature moves between a first end position and a second end position, *in the first end position the armature is spaced apart from and does not contact the mechanism*, as recited by the claims. Also, if the lost motion connection guide 44 is interpreted to be part of armature 32, then armature 32 of Bastle is *continually* in contact with valve 18 (the mechanism) of Bastle.

In the office action, the examiner's response to applicant's arguments notes that the mechanism of Bastle will not be activated until the armature force is greater than the maximum force applied by the spring. The claimed features, however, are that the spring force is significantly greater than under normal operating condition and the armature force is greater than the maximum force necessary to activate the mechanism (the maximum force applied by the spring is not a claimed feature). The maximum force necessary to activate the mechanism is a claim limitation that is directed to the reality that mechanisms may become sticky and require different amounts of force to activate them. The invention provides a technique for providing consistent activation times, regardless of whether the mechanism is sticky or not.

Grunert does not cure the deficiencies of Bastle. Grunert describes an electromagnetic circuit breaker having a trip delay device to avoid spurious trips. In Grunert, coil spring 90 absorbs armature forces up to a predetermined amount that is *based on the trip current* and under normal operating conditions, the solenoid is activated at the predetermined trip current level. Therefore, coil spring 90 of Grunert is sized according to the trip current and does not provide a *force significantly greater than under normal operating conditions*, as recited by the claims.

Nor is there any motivation to apply the disclosure of Grunert to Bastle. The examiner argues that it would be obvious to provide a space between the armature end and the engagement piece in Bastle for the purpose of providing an impact. Bastle, however, already provides an impact through the lost motion connection of guide 44 (Bastle at c. 2, ll. 10-14). Therefore, no motivation exists to combine Grunert with Bastle.

Nor does Harper cure the deficiencies of Bastle and Grunert. Harper discloses an inertial wheel for reducing nuisance trips of an electronic circuit breaker (similar to Grunert), but does not disclose or suggest a delay member for delaying the movement of the armature with a force significantly *greater* than under normal operating conditions, until such time as the armature exhibits an armature force greater than the maximum force necessary to activate the mechanism, as recited by the claims.

Accordingly, applicant submits that the cited references, either taken alone or in combination, do not disclose or suggest all of the features of independent claims 1, 8, or 16. Therefore, applicant respectfully submits that claims 1, 8, and 16 and all claims dependant therefrom, including claims 2-7, 9-15, 17-22, and 24-28 are patentable over the cited references. Accordingly, applicant respectfully requests reconsideration and withdrawal of the rejections of claims 1-22 and 24-28 under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a).

Dependent Claim 24

Dependent claim 24 includes features that are neither disclosed nor suggested by the cited references, either taken alone or in combination, namely:

24. (Previously Presented) The method of claim 1, wherein delaying the movement of the armature and impacting the mechanism with the armature provide ***mechanism activation times*** consistent to within one millisecond.

In the office action, the examiner states that the specific "delay time" of the activation/movement of the armature would have been an obvious design consideration based on the specific application. Applicant notes that the claimed feature is not a delay time; rather, the claimed feature is the *consistency of mechanism activation times*. This may be important to electrical switching devices that require a known consistent activation time in order to enable the design of stable power systems (like a power grid that must respond quickly and with known activation times in order to prevent any problems from cascading to other portions of the power grid). Applicant submits that it is not obvious how to provide consistent activation times. For example, one might attempt to use the *smallest* spring possible, theorizing that allowing the full force of a small solenoid to be applied to the

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mechanism would result in consistent actuation times. Therefore, applicant submits that it is not obvious how to provide consistent actuation times by selecting a particular delay time.

Accordingly, applicant submits that the cited references, either taken alone or in combination, do not disclose or suggest all of the features of dependent claim 24. Accordingly, applicant respectfully requests reconsideration and withdrawal of the rejections of claim 24 under 35 U.S.C. § 103(a).

Newly Added Claims

Claims 29-31 have been added to further define the invention.

Conclusion

For all the foregoing reasons, applicant respectfully submits that the present application is now in condition for allowance. Reconsideration of the office action and an early notice of allowance are respectfully requested. In the event that the examiner cannot allow the present application for any reason, the examiner is encouraged to contact the undersigned attorney, Raymond N. Scott Jr. at (215) 564-8951, to discuss resolution of any remaining issues.

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